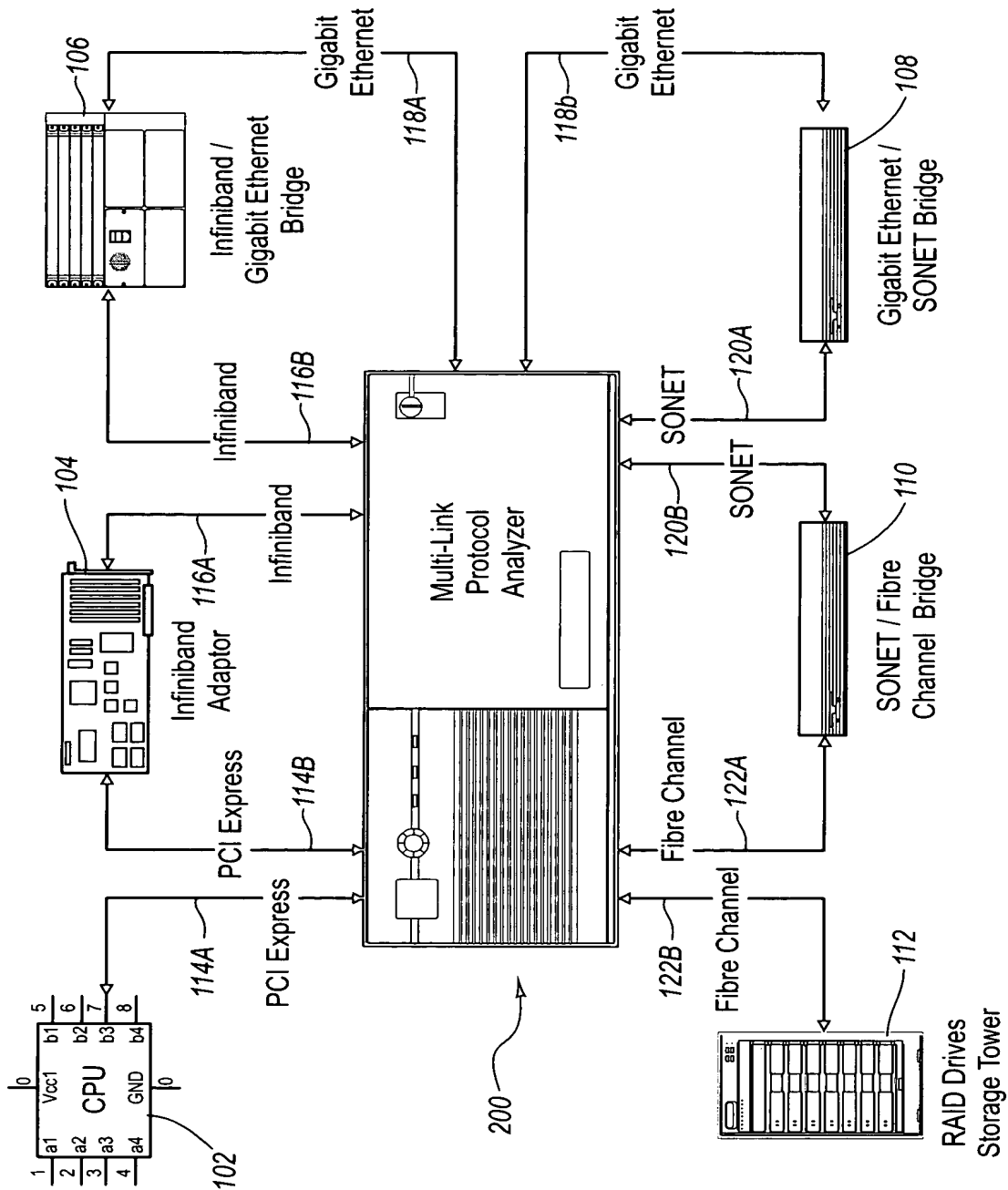Title: SYSTEMS AND METHODS FOR TIME BASED SORTING AND DISPLAY OF
CAPTURED DATA EVENTS IN A MULTI-PROTOCOL COMMUNICATIONS SYSTEM
Inventors: Durham, et al.
Docket No.: 15436.162.1

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Fig. 1

102 — CPU

114 — PCI Express

104 — Infiniband Adaptor

116 — Infiniband

106 — Infiniband / Gigabit Ethernet Bridge

118 — Gigabit Ethernet

108 — Gigabit Ethernet / SONET Bridge

120 — SONET

110 — SONET / Fibre Channel Bridge

122 — Fibre Channel

112 — RAID Drives Storage Tower

Title: SYSTEMS AND METHODS FOR TIME BASED SORTING AND DISPLAY OF
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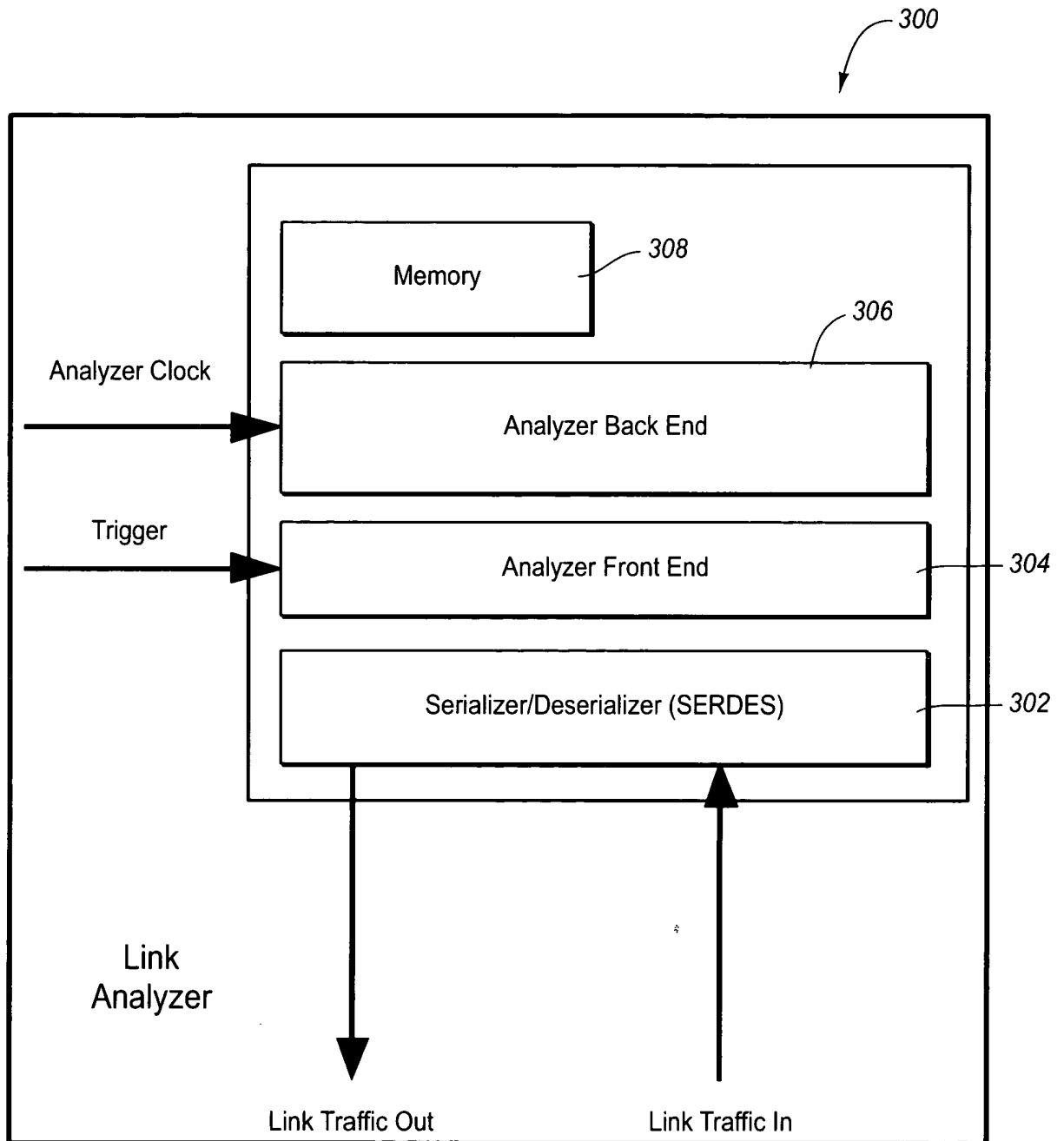2 / 7

Fig. 2

Title: SYSTEMS AND METHODS FOR TIME BASED SORTING AND DISPLAY OF
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Inventors: Durham, et al.
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300

Memory ~ 308

Analyzer Clock

Analyzer Back End — 306

Trigger

Analyzer Front End — 304

Serializer/Deserializer (SERDES) — 302

Link
Analyzer

Link Traffic Out   Link Traffic In

Fig. 3

Title: SYSTEMS AND METHODS FOR TIME BASED SORTING AND DISPLAY OF
CAPTURED DATA EVENTS IN A MULTI-PROTOCOL COMMUNICATIONS SYSTEM
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— 400

Link 1 Data In →

Analyzer 1 — 402

Link 1 Data
Out ←

Trigger   Analyzer Clock

402A   402B

Link 2 Data In →

Analyzer 2 — 404

Link 2 Data
Out ←

Analyzer Clock

Trigger   Analyzer Clock

404A   404B

Link 3 Data In →

Analyzer 3 — 406

Link 3 Data
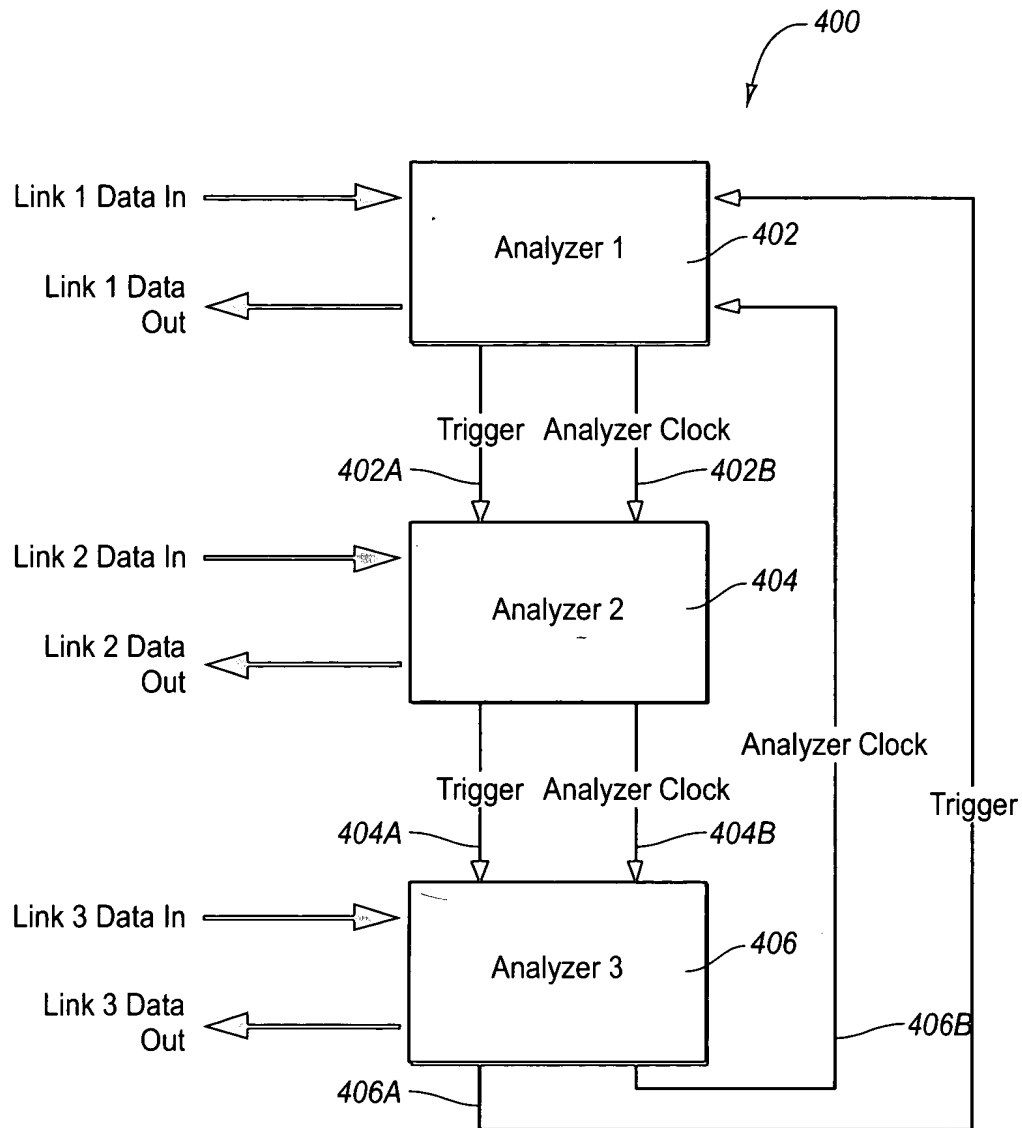Out ←

Trigger

406B

406A

Fig. 4

Title: SYSTEMS AND METHODS FOR TIME BASED SORTING AND DISPLAY OF
CAPTURED DATA EVENTS IN A MULTI-PROTOCOL COMMUNICATIONS SYSTEM
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For Each Channel Of Capture Data Create And A Buffer — 502

Sort Each Buffer By Timestamp — 504

Fill Display Loop Begin — 506

Reset Candidate Timestamp And Buffer Pointer — 508

Find Next Event Loop Begin — 510

Is Timestamp Of Top Most Event Less Then Current Candidate Timestamp ? — 512

Yes

Set Candidate Timestamp To Buffer Timestamp — 514

No

Add Event To Display — 522

Display Filled ? — 524

Yes

No

Fill Display Loop End — 528

Last Buffer ? — 516

Yes

No

Done Filing Display — 526

Move To Next Event Buffer — 518
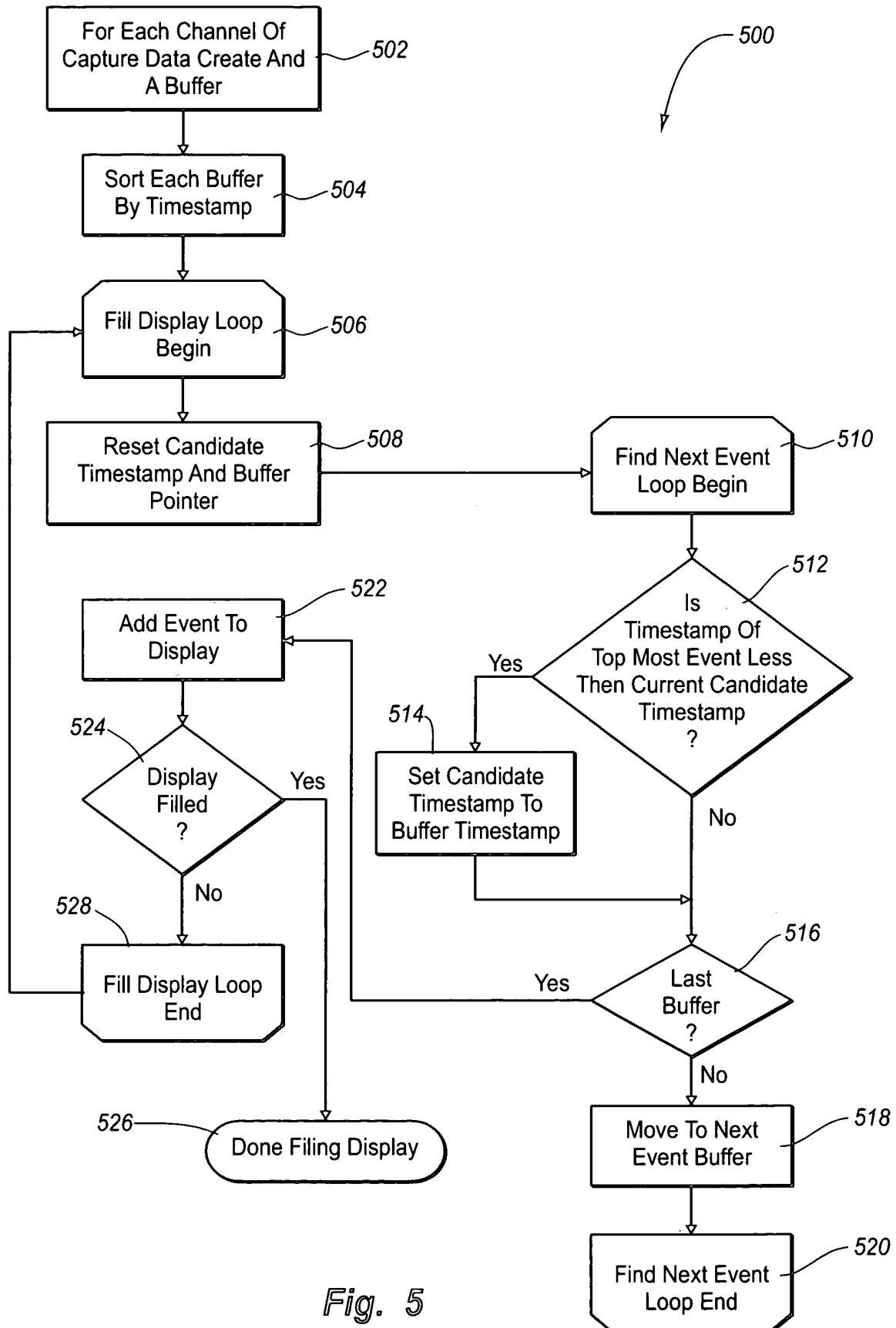
Find Next Event Loop End — 520

— 500

Fig. 5

Title: SYSTEMS AND METHODS FOR TIME BASED SORTING AND DISPLAY OF
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Inventors: Durham, et al.
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600

Time Stamp Column displays
the beginning of each event
for each link

Delta Time per port shows the
duration of each event.

The Analyzer Port that each
the event was captured on.
This corresponds to the link
that was analyzed.

602   604   610   606   612

File Edit View Histogram Tools Window Options Help   000:00:03.544

mm:ss.ms_us_ns (Abs)	DT/Port	Port	Primitive	Bytes	Summary
00:03:544_274_146	0.008	GE_Port 8	Idle1	2	
00:03:544_274_162	0.016	GE_Port 8	Idle2	2	
00:03:544_274_178	0.016	GE_Port 8	Idle2	2	
00:03:544_274_208	0.075	FC_Port 6	Ordered Set	4	
00:03:544_274_244	0.038	FC_Port 6	Ordered SetSet	4	
00:03:544_274_319	0.075	FC_Port 6	Ordered Set	4	
00:03:544_274_357	0.038	FC_Port 6	Ordered Set	4	
00:03:544_274_394	0.038	FC_Port 6	Ordered Set	4	
00:03:544_274_432	0.038	FC_Port 6	Ordered Set	4	
00:03:544_274_470	0.038	FC_Port 6	Ordered Set	4	
00:03:544_274_482	0.304	GE_Port 8	Idle2	2	
00:03:544_274_498	0.016	GE_Port 8	Preamble	8	
00:03:544_274_545	0.075	FC_Port 6	Frame	2084	RCtl=FC4SData; Type = SCSI FCP;
00:03:544_274_562	0.064	GE_Port 8	Ethernet Frame	83	OSPF Packet Type = Hello; Router ID;
00:03:544_274_593	1.223	FC_Port 4	Ordered Set	4	
00:03:544_274_630	0.038	FC_Port 4	Ordered Set	4	
00:03:544_274_668	0.038	FC_Port 4	Ordered Set	4	
00:03:544_274_743	0.075	FC_Port 4	Ordered Set	4	
00:03:544_274_781	0.038	FC_Port 4	Ordered Set	4	
00:03:544_274_856	0.075	FC_Port 4	Ordered Set	4	
00:03:544_274_894	0.038	FC_Port 4	Ordered Set	4	
00:03:544_274_969	0.075	FC_Port 4	Ordered Set	4	

608

Events are listed down the
page in time order.

Type of event is listed for
each event.

Fig. 6

Title: SYSTEMS AND METHODS FOR TIME BASED SORTING AND DISPLAY OF
CAPTURED DATA EVENTS IN A MULTI-PROTOCOL COMMUNICATIONS SYSTEM
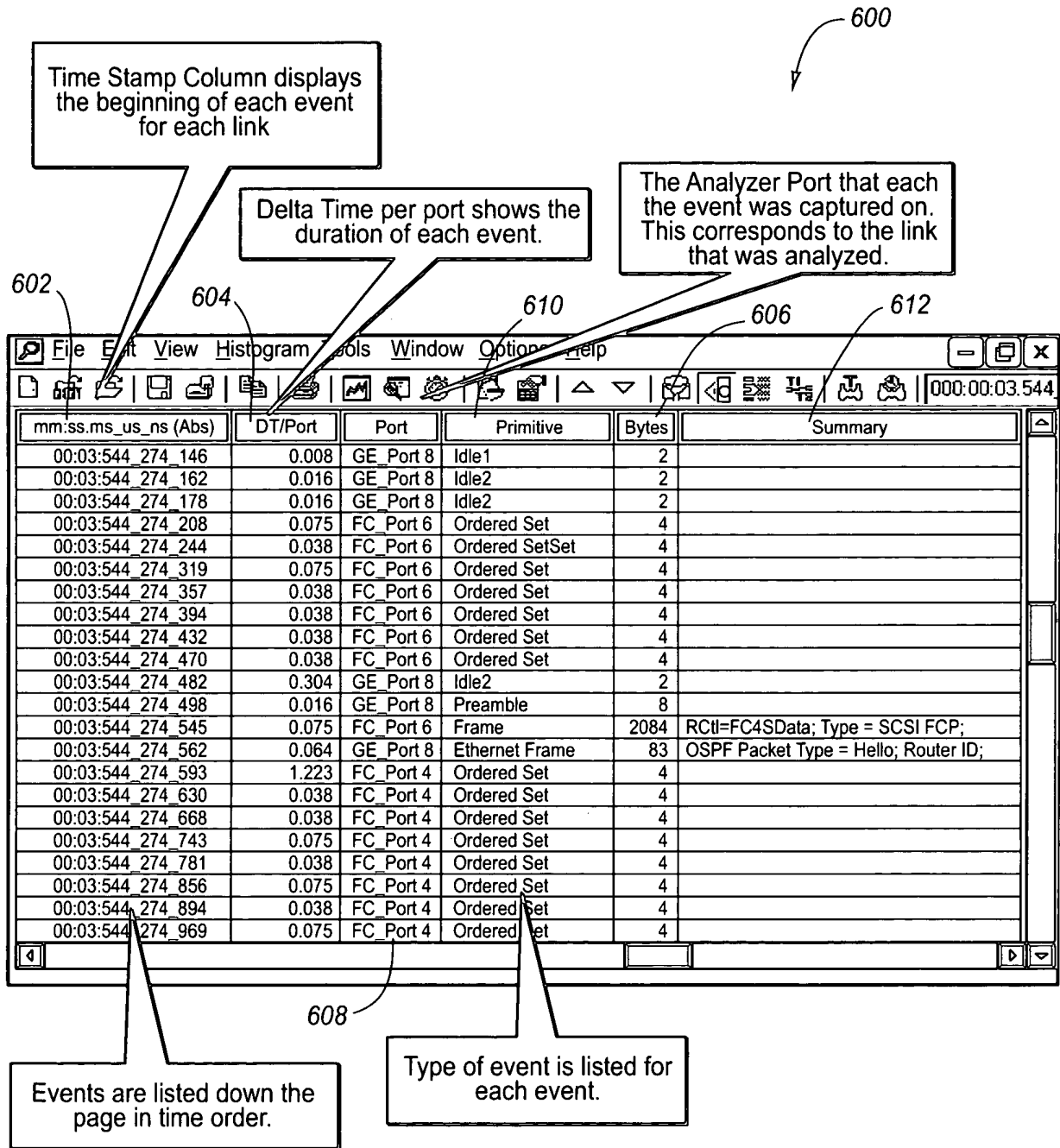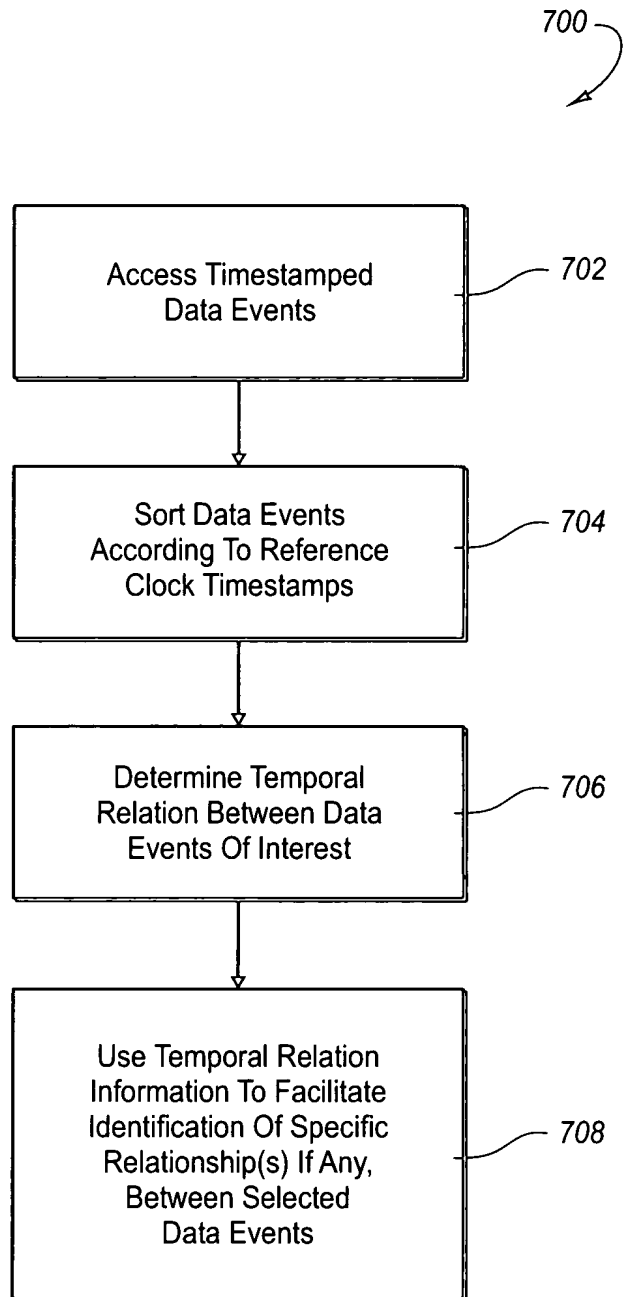Inventors: Durham, et al.
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Access Timestamped
Data Events — 702

Sort Data Events
According To Reference
Clock Timestamps — 704

Determine Temporal
Relation Between Data
Events Of Interest — 706

Use Temporal Relation
Information To Facilitate
Identification Of Specific
Relationship(s) If Any,
Between Selected
Data Events — 708

Fig. 7